checked by
3/3/2016

MEMORANDUM

TO: Mr. Addison Rice
Anderson, Mulholland and Associates

DATE: February 25, 2016

FROM: R. Infante

FILE: 1602029

RE: Data Validation
Air samples
SDG: 1602029

SUMMARY

Full validation was performed on the data for several gas samples analyzed for naphthalene and one sample analyzed for several vocs by method Compendium Method TO-17: Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes, January 1999. The samples were collected at Bristol Myer Squib, Humacao, PR site on January 30-31, 2016 and submitted to Eurofins Air Toxics, Inc. of Folson, California that analyzed and reported the results under delivery groups (SDG) 1602029.

The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: Compendium Method TO-17. Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling Onto Sorbent Tubes, January, 1999. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

In general the data is valid as reported and may be used for decision making purposes. The data results are acceptable for use. Several VOCs were qualified as estimated (j) in sample 1602029-13A due to concentration exceeding calibration range or due to peak saturation that did not allowed proper integration. Laboratory qualified the analytes as (E) concentration over calibration range and (S) saturated peak.

SAMPLES

The samples included in the review are listed below

Client Sample ID	Lab. Sample ID	Collected Date	Matrix	Analysis
B30-1IA013016	1602029-01A	01/30-31/16	Air	Naphtahlene
B30-2IA013016	1602029-02A	01/30-31/16	Air	Naphtahlene
B30-3IA013016	1602029-03A	01/30-31/16	Air	Naphtahlene
B30-4IA013016	1602029-04A	01/30-31/16	Air	Naphtahlene
B30-4IAD013016	1602029-05A	01/30-31/16	Air	Naphtahlene
B30-5IA013016	1602029-06A	01/30-31/16	Air	Naphtahlene
B3042AA013016	1602029-07A	01/30-31/16	Air	Naphtahlene
B42-1IA013016	1602029-08A	01/30-31/16	Air	Naphtahlene
B42-2IA013016	1602029-09A	01/30-31/16	Air	Naphtahlene
B42-3IA013016	1602029-10A	01/30-31/16	Air	Naphtahlene

Client Sample ID	Lab. Sample ID	Collected Date	Matrix	Analysis
B3042-FB1IA	1602029-11A	01/31/16	Air	Naphtahlene
B3042-FB2SSV	1602029-12A	01/31/16	Air	Naphtahlene
B30-1SSV013116	1602029-13A	01/31/16	Air	VOCs
B30-2SSV013116	1602029-14A	01/31/16	Air	Naphtahlene
B30-3SSV013116	1602029-15A	01/31/16	Air	Naphtahlene
B30-4SSV013116	1602029-16A	01/31/16	Air	Naphtahlene
B30-4DSSV013116	1602029-17A	01/31/16	Air	Naphtahlene
B30-5SSV013116	1602029-18A	01/31/16	Air	Naphtahlene
B42-1SSV013116	1602029-19A	01/31/16	Air	Naphtahlene
B42-2SSV013116	1602029-20A	01/31/16	Air	Naphtahlene
B42-3SSV013116	1602029-21A	01/31/16	Air	Naphtahlene

REVIEW ELEMENTS

Sample data were reviewed for the following parameters, where applicable to the method

- Agreement of analysis conducted with chain of custody (COC) form
- Holding time and sample preservation
- Gas chromatography/mass spectrometry (GC/MS) tunes
- Initial and continuing calibrations
- Method blanks/trip blanks/field blank
- Absorbent tube desorption efficiency
- Surrogate spike recovery
- Internal standard performance and retention times
- Field duplicate results
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analysis Conducted with COC Request

Sample reports corresponded to the analytical request designated on the chain-of-custody form.

Holding Times and Sample Preservation

Sample preservation was acceptable.

Samples analyzed within method recommended holding time.

GC/MS Tunes

The frequency and abundance of bromofluorobenzene (BFB) tunes were within the QC acceptance criteria. All samples were analyzed within the tuning criteria associated with the method.

Initial and Continuing Calibrations

VOCs and Naphthalene (Method TO-17)
Initial calibration meets the method performance criteria. Ongoing accuracy of the instrument was determined by the analysis of a continuing calibration standard. Continuing calibration meets the method performance criteria.

Method Blank/Trip Blank/Field Blank

Target analytes were not detected in laboratory method blanks above the method reporting limits.

No trip/field blank analyzed with this data package.

Surrogate Spike Recovery

The surrogate recoveries as per method TO-17 were within the laboratory QC acceptance limits in all samples analyzed.

Internal Standard Performance

VOCs and Naphthalene
Samples were spiked with the method specified internal standard. Internal standard are performance and retention times met the QC acceptance criteria in all sample analyses and calibration standards.

Laboratory/Field Duplicate Results

Field duplicates were analyzed as part of this data set for naphthalene. Target analytes meet the RPD performance criteria for analytes 5 x SQL.

For VOCs no field/laboratory duplicates were analyzed. LCS/LCSD results used to assess precision; RPD meet the method performance criteria.

LCS/LCSD Results

LCS/LCSD (blank spike) analyzed by the laboratory associated with this data package; recoveries and RPD within laboratory control limits.

Quantitation Limits and Sample Results

Dilutions were not performed on TO-17 samples.

Calculations were spot checked.

Certification

The following samples 1602029-01A; 1602029-02A; 1602029-03A; 1602029-04A; 1602029-05A; 1602029-06A; 1602029-07A; 1602029-08A; 1602029-09A; 1602029-10A; 1602029-11A; 1602029-12A; 1602029-13A; 1602029-14A; 1602029-15A; 1602029-16A; 1602029-17A; 1602029-18A; 1602029-19A; 1602029-20A; and 1602029-21A were analyzed following standard procedures accepted by regulatory agencies. The quality control requirements met the methods criteria except in the occasions described in this document. The results are valid.

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Client Sample ID: B30-1IA013016

Lab ID#: 1602029-01A

EPA METHOD TO-17

File Name:	**18020310**	**Date of Extraction: N/A**	**Date of Collection: 1/31/16 1:35:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 04:35 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	0.11	5.0	0.54

Air Sample Volume(L): 9.30
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	90	50-150

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Client Sample ID: B30-2IA013016

Lab ID#: 1602029-02A

EPA METHOD TO-17

File Name:	**18020311**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 6:42:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 05:13 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	0.079	0.98 J	0.077 J

Air Sample Volume(L): 12.6

J = Estimated value.

Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	88	50-150

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Client Sample ID: B30-3IA013016

Lab ID#: 1602029-03A

EPA METHOD TO-17

File Name:	**18020312**	**Date of Extraction: N/A**	**Date of Collection: 1/31/16 10:42:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 05:51 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	0.068	1.4	0.095

Air Sample Volume(L): 14.8
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	95	50-150

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Client Sample ID: B30-4IA013016

Lab ID#: 1602029-04A

EPA METHOD TO-17

File Name:	**18020313**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 10:42:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 06:30 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	0.068	2.3	0.16

Air Sample Volume(L): 14.8
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	99	50-150

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Client Sample ID: B30-4IAD013016

Lab ID#: 1602029-05A

EPA METHOD TO-17

File Name:	**18020314**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 10:42:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 07:08 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	0.069	2.5	0.18

Air Sample Volume(L): 14.4
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	97	50-150

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Client Sample ID: B30-5IA013016

Lab ID#: 1602029-06A

EPA METHOD TO-17

File Name:	**18020315**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 10:55:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 07:47 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	0.067	1.2	0.082

Air Sample Volume(L): 14.9
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	92	50-150

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Client Sample ID: B3042AA013016

Lab ID#: 1602029-07A

EPA METHOD TO-17

File Name:	**18020316**	**Date of Extraction: NA**	**Date of Collection: 1/30/16 5:55:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 08:25 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	0.068	Not Detected	Not Detected

Air Sample Volume(L): 14.6
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	61	50-150

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Client Sample ID: B42-1IA013016

Lab ID#: 1602029-08A

EPA METHOD TO-17

File Name:	**18020317**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 11:20:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 09:03 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	0.067	1.7	0.12

Air Sample Volume(L): 14.9
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	84	50-150

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Client Sample ID: B42-2IA013016

Lab ID#: 1602029-09A

EPA METHOD TO-17

File Name:	**18020318**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 11:08:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 09:41 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	0.068	1.5	0.10

Air Sample Volume(L): 14.8
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	99	50-150

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Client Sample ID: B42-3IA013016

Lab ID#: 1602029-10A

EPA METHOD TO-17

File Name:	**18020329**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 11:15:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/4/16 09:20 AM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	0.068	1.3	0.091

Air Sample Volume(L): 14.8
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	90	50-150

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Client Sample ID: B3042-FB1IA

Lab ID#: 1602029-11A

EPA METHOD TO-17

File Name:	**18020309**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 10:52:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 03:56 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	0.067	0.48 J	0.032 J

Air Sample Volume(L): 14.9

J = Estimated value.

Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	87	50-150

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Client Sample ID: B3042-FB2SSV

Lab ID#: 1602029-12A

EPA METHOD TO-17

File Name:	**18020308**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 10:59:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 02:52 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	0.067	Not Detected	Not Detected

Air Sample Volume(L): 14.9
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	91	50-150

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Client Sample ID: B30-1SSV013116

Lab ID#: 1602029-13A

EPA METHOD TO-17

File Name:	**11020417**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 12:27:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/4/16 11:53 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Freon 114	14	35	Not Detected	Not Detected
Vinyl Chloride	5.1	13	69	170
1,3-Butadiene	2.2	5.5	Not Detected	Not Detected
Isopentane	5.9	15	370	920
Freon 11	11	28	Not Detected	Not Detected
1,1-Dichloroethene	4.0	10	30	74
Methylene Chloride	21	52	15 J	38 J
Freon 113	7.7	19	Not Detected	Not Detected
trans-1,2-Dichloroethene	8.0	20	4.2 J	11 J
1,1-Dichloroethane	4.0	10	15	39
cis-1,2-Dichloroethene	4.0	10	22	55
Hexane	35	88	1300 E J	3200 E
Chloroform	4.9	12	Not Detected	Not Detected
1,2-Dichloroethane	4.0	10	Not Detected	Not Detected
1,1,1-Trichloroethane	5.4	14	Not Detected	Not Detected
Benzene	6.4	16	270	680
Carbon Tetrachloride	6.3	16	Not Detected	Not Detected
Cyclohexane	6.9	17	1000 E J	2600 E
1,2-Dichloropropane	4.6	12	Not Detected	Not Detected
Trichloroethene	5.4	14	3.1 J	7.8 J
1,4-Dioxane	11	28	Not Detected	Not Detected
2,2,4-Trimethylpentane	9.4	24	23	56
Heptane	8.2	20	220	560
Methylcyclohexane	8.0	20	150	370
1,1,2-Trichloroethane	5.4	14	Not Detected	Not Detected
4-Methyl-2-pentanone	8.2	20	Not Detected	Not Detected
Toluene	7.5	19	18	44
2-Hexanone	8.2	20	Not Detected	Not Detected
Tetrachloroethene	6.8	17	2.1 J	5.3 J
Chlorobenzene	4.6	12	Not Detected	Not Detected
Ethyl Benzene	4.3	11	2500 E J	6200 E
m,p-Xylene	35	87	>38000 S J	>95000 S
o-Xylene	8.7	22	620	1600
Styrene	8.5	21	Not Detected	Not Detected
1,1,2,2-Tetrachloroethane	6.9	17	Not Detected	Not Detected
Cumene	9.8	24	5.1 J	13 J
Propylbenzene	9.8	24	2.2 J	5.6 J
4-Ethyltoluene	9.8	24	Not Detected	Not Detected
1,3,5-Trimethylbenzene	9.8	24	[illegible]	7.5 J
1,2,4-Trimethylbenzene	29	72	[illegible]	26 J
1,3-Dichlorobenzene	6.0	15	20	49
1,4-Dichlorobenzene	6.0	15	Not Detected	Not Detected

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Client Sample ID: B30-1SSV013116

Lab ID#: 1602029-13A

EPA METHOD TO-17

File Name:	**11020417**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 12:27:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/4/16 11:53 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
1,2-Dichlorobenzene	6.0	15	Not Detected	Not Detected
1,2,4-Trichlorobenzene	15	38	Not Detected	Not Detected
Hexachlorobutadiene	21	52	Not Detected	Not Detected
Naphthalene	1.0	2.5	0.60 J	1.5 J

Air Sample Volume(L): 0.400

J = Estimated value.
E = Exceeds instrument calibration range.
S = Saturated peak; data reported as estimated.
m,p-Xylene was reported from file #11020832, analyzed on 2/9/16 with a dilution factor of 4.00.

Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	86	50-150
Toluene-d8	119	50-150
Naphthalene-d8	103	50-150

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Client Sample ID: B30-2SSV013116

Lab ID#: 1602029-14A

EPA METHOD TO-17

File Name:	**18020320**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 12:45:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 10:58 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	2.5	Not Detected	Not Detected

Air Sample Volume(L): 0.400
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	82	50-150

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Client Sample ID: B30-3SSV013116

Lab ID#: 1602029-15A

EPA METHOD TO-17

File Name:	**18020321**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 1:04:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/3/16 11:36 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	2.5	Not Detected	Not Detected

Air Sample Volume(L): 0.400
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	92	50-150

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Client Sample ID: B30-4SSV013116

Lab ID#: 1602029-16A

EPA METHOD TO-17

File Name:	**18020322**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 1:33:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/4/16 12:15 AM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	2.5	Not Detected	Not Detected

Air Sample Volume(L): 0.400
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	92	50-150

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Client Sample ID: B30-4DSSV013116

Lab ID#: 1602029-17A

EPA METHOD TO-17

File Name:	**18020323**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 1:28:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/4/16 12:53 AM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	2.5	Not Detected	Not Detected

Air Sample Volume(L): 0.400
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	92	50-150

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Client Sample ID: B30-5SSV013116

Lab ID#: 1602029-18A

EPA METHOD TO-17

File Name:	**18020324**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 1:55:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/4/16 01:31 AM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	2.5	Not Detected	Not Detected

Air Sample Volume(L): 0.400
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	91	50-150

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Summary of Detected Compounds
EPA METHOD TO-17

Client Sample ID: B42-1SSV013116

Lab ID#: 1602029-19A

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	2.5	0.52 J	1.3 J

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Client Sample ID: B42-2SSV013116

Lab ID#: 1602029-20A

EPA METHOD TO-17

File Name:	**18020326**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 4:28:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/4/16 02:48 AM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	2.5	3.0	7.5

Air Sample Volume(L): 0.400
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	96	50-150

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Client Sample ID: B42-3SSV013116

Lab ID#: 1602029-21A

EPA METHOD TO-17

File Name:	**18020330**	**Date of Extraction: NA**	**Date of Collection: 1/31/16 4:10:00 PM**
Dil. Factor:	**1.00**		**Date of Analysis: 2/4/16 09:59 AM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	2.5	Not Detected	Not Detected

Air Sample Volume(L): 0.400
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	95	50-150

TO-17 SAMPLE COLLECTION

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

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FOLSOM, CA 95630
(916) 985-1000 FAX (916) 985-1020

0900 of 0912

Project Manager Terry Taylor
Collected by: (Print and Sign) Terry Taylor David Lindstrand
Company AM AI Email
Address 2700 Westchester Ave City Purchase State NY Zip 10541
Phone 914-251-0400 Fax

Project Info:
P.O. #
Project #
Project Name BMS VI

Turn Around Time: ☒ Normal ☐ Rush ____ specify

Reporting Units: ☐ ppmv ☒ ppbv ☒ µg/m3 ☐ mg/m3

Lab I.D.	Field Sample I.D. (Location)	Engraved or Stamped Tube #	Date of Collection (mm/dd/yy)	Start Time (hr:min)	End Time (hr:min)	Pre-Test Flow Rate	Post-Test Flow Rate	Volume l	Indoor/Outdoor % RH	Indoor/Outdoor Temp	Indoor Air	Outdoor Air	Soil Vapor	Other ( )
01A	B30-1IA013016	60137179	1/30/16	1030	0135	35ml/min	35ml/min	93l	82.5	79	☒	☐	☐	☐
02A	B30-2IA013016	60152248	1/30-31/16	1035	0642	35ml/min	36ml/min	12.6l	83	79	☒	☐	☐	☐
03A	B30-3IA013016	60188144	1/30-31/16	1042	1042	35ml/min	35ml/min	14.8	80	80	☒	☐	☐	☐
04A	B30-4IA013016	60132032	1/30-31/16	1042	1042	35ml/min	35ml/min	14.8	79	82	☒	☐	☐	☐
05A	B30-4IAD013016	60139959	1/30-31/16	1042	1042	35ml/min	33ml/min	14.4	79	82	☒	☐	☐	☐
06A	B30-5IA013016	60144385	1/30-31/16	1055	1055	35ml/min	36ml/min	14.9	80	81	☒	☐	☐	☐
07A	B3042AA013016	60143465	1/30/16	1103	1755	35ml/min	36ml/min	14.6l	65	86	☐	☒	☐	☐
08A	B42-1IA013016	60140124	1/30-31/16	1120	1120	35ml/min	36ml/min	14.9	83	87	☒	☐	☐	☐
09A	B42-2IA013016	60137189	1/30-31/16	1108	1108	35ml/min	35ml/min	14.8	61	78	☒	☐	☐	☐
10A	B42-3IA013016	60145581	1/30-31/16	1115	1115	35ml/min	35ml/min	14.8	67	76	☒	☐	☐	☐

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
David Lindstrand	Feb. 1, 2016 1200	FEDEX	2-2-16 1020
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes: Naphthalene ONLY. Report to MDL. Sample collection was cycled over Start/End Time

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		2-8C	Good	Yes No (None)	1602029

TO-17 SAMPLE COLLECTION

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630
(916) 985-1000 FAX (916) 985-1020

Project Manager Terry Taylor
Collected by: (Print and Sign) Terry Taylor
Company AMAI Email
Address 200 Westchester Ave City Purchase State NY Zip 10577
Phone 914-251-0400 Fax

Project Info:
P.O. #
Project #
Project Name BMS VI

Turn Around Time: ☒ Normal ☐ Rush _____ specify

Reporting Units: ☐ ppmv ☒ ppbv ☒ µg/m3 ☐ mg/m3

Lab I.D.	Field Sample I.D. (Location)	Engraved or Stamped Tube #	Date of Collection (mm/dd/yy)	Start Time (hr:min)	End Time (hr:min)	Pre-Test Flow Rate ml/min	Post-Test Flow Rate ml/min	Volume ml	Indoor/Outdoor % RH	Indoor/Outdoor Temp	Indoor Air	Outdoor Air	Soil Vapor	Other ( )
11A	B3042-FB1IA	60130962	1/31/16	1052	1052	/	/	/	78	82	☒	☐	☐	☐
12A	B3042-FB2SSV	60187158	1/31/16	1059	1059	/	/	/	78	82	☐	☐	☒	☐
13A	B30-1SSV013116	60129354	1/31/16	1224	1227	133	133	400	83	79	☐	☐	☒	☐
14A	B30-2SSV013116	60143780	1/31/16	1242	1245	133	133	400	83	79	☐	☐	☒	☐
15A	B30-3SSV013116	60135686	1/31/16	1301	1304	133	133	400	80	80	☐	☐	☒	☐
16A	B30-4SSV013116	60150385	1/31/16	1329 1330	1333	133	133	400	79	82	☐	☐	☒	☐
17A	B30-4DSSV013116	60143423	1/31/16	1325	1328	133	133	400	79	82	☐	☐	☒	☐
18A	B30-5SSV013116	60143629	1/31/16	1352	1355	133	133	400	80	81	☐	☐	☒	☐
19A	B42-1SSV013116	60137246	1/31/16	1641	1644	133	133	400	83	87	☐	☐	☒	☐
20A	B42-2SSV013116	60137108	1/31/16	1625	1628	133	133	400	61	78	☐	☐	☒	☐

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
	Feb. 1, 2016 1200	FedEx	2-2-16 1020
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:
B30-1SSV013116 analyze for Full TO-15 compounds. All other samples Naphthalene ONLY. Report to MDL.

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		2-8°C	Good	Yes No None	1602029

TO-17 SAMPLE COLLECTION

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
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180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630
(916) 985-1000 FAX (916) 985-1020

0902 of 0912

Project Manager Terry Taylor
Collected by: (Print and Sign) Terry Taylor
Company AMAI Email
Address 2000 Westchester Ave City Purchase State NY Zip 10577
Phone 914-39-1225 Fax

Project Info:
P.O. #
Project # 160229
Project Name BMS VI

Turn Around Time:
☒ Normal
☐ Rush
specify

Reporting Units:
☐ ppmv
☒ ppbv
☒ µg/m3
☐ mg/m3

Lab I.D.	Field Sample I.D. (Location)	Engraved or Stamped Tube #	Date of Collection (mm/dd/yy)	Start Time (hr:min)	End Time (hr:min)	Pre-Test Flow Rate ml/min	Post-Test Flow Rate ml/min	Volume ml	Indoor/Outdoor % RH	Indoor/Outdoor Temp	Indoor Air	Outdoor Air	Soil Vapor	Other ( )
21A	B42-3SSV013116	60131913	1/31/16	1607	1610	133	133	400	67	76	☐	☐	☒	☐
											☐	☐	☐	☐
											☐	☐	☐	☐
											☐	☐	☐	☐
											☐	☐	☐	☐
											☐	☐	☐	☐
											☐	☐	☐	☐
											☐	☐	☐	☐
											☐	☐	☐	☐
											☐	☐	☐	☐

Relinquished by: (signature) Date/Time 12:00 Feb. 1, 2016
Received by: (signature) Date/Time FEDEX 2-2-16 1020

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Notes:
Analyze for Naphthalene ONLY. Report to MDL

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		2.8°C	Good	Yes No (None)	1602029

DATA REVIEW WORKSHEETS

Project Number:__1602029____
Date:_____01/30-31/2016___

REVIEW OF VOLATILE ORGANIC PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: QC criteria from "Compendium Method TO-15. Determination of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters and Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999"; USEPA Hazardous Waste Support Branch. Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #4. October, 2006). The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.
The hardcopied (laboratory name) _Eurofins_-_Air_Toxics_____ data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: __1602029_____ Sample matrix: ___Air_____
No. of Samples: _____20_____

Trip blank No.: ____-_____
Field blank No.: _____-_____
Equipment blank No.:___-_____
Field duplicate No.:__B30-4IA013016/B30-4IAD013016;_B30-4SSV013116/B30-4DSSV013116__

___X___ Data Completeness
___X___ Holding Times
___X___ GC/MS Tuning
___X___ Internal Standard Performance
___X___ Blanks
___X___ Surrogate Recoveries
___N/A_ Matrix Spike/Matrix Spike Duplicate
___X___ Laboratory Control Spikes
___X___ Field Duplicates
___X___ Calibrations
___X___ Compound Identifications
___X___ Compound Quantitation
___X___ Quantitation Limits

Overall Comments:_____Naphthalene_by_method_TO-17_____
_____

Definition of Qualifiers:
J- Estimated results
U- Compound not detected
R- Rejected data
UJ- Estimated nondetect

Reviewer: Rafael Infante
Date:__ _____02/24/2016_____

DATA REVIEW WORKSHEETS

DATA COMPLETENESS

MISSING INFORMATION	DATE LAB. CONTACTED	DATE RECEIVED

DATA REVIEW WORKSHEETS

All criteria were met __X__
Criteria were not met
and/or see below _____

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE ANALYZED	pH	ACTION
All samples analyzed within the recommended method holding time				

Criteria

Aqueous samples – 14 days from sample collection for preserved samples (pH $\leq$ 2, 4°C), no air bubbles.
Aqueous samples – 7 days from sample collection for unpreserved samples, 4°C, no air bubbles.
Soil samples- 7 days from sample collection.
Cooler temperature (Criteria: 4 $\pm$ 2 °C): 2.8°C

Actions

If the VOCs vial(s) have air bubbles, estimate positive results (J) and reject nondetects (R).
If the % solids of soil samples is 10-50%, estimates positive results (J) and nondetects (UJ)
If the % solid of soil samples is < 10%, estimate positive results (J) and reject nondetects (R).
If holding times are exceeded but < 14 days beyond criteria, estimate positive results (J) and nondetects (UJ).
If holding times are exceeded but < 28 days beyond criteria, estimate positive results (J) and reject nondetects (R).
If holding times are grossly exceeded (> 28 days beyond criteria), reject all results (R).
If samples were not iced or if the ice were melted (> 10°C), estimate positive results (J) and nondetects (UJ).

DATA REVIEW WORKSHEETS

All criteria were met __X__
Criteria were not met see below ____

GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

__X___ The BFB performance results were reviewed and found to be within the specified criteria.

__X___ BFB tuning was performed for every 24 hours of sample analysis.

If no, use professional judgment to determine whether the associated data should be accepted, qualified or rejected.

List the samples affected:
_____

If mass calibration is in error, all associated data are rejected.

DATA REVIEW WORKSHEETS

All criteria were met __X__
Criteria were not met
and/or see below _____

CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:_____01/14/16____
Dates of continuing calibration:___02/03/16____
Instrument ID numbers:____MSD-18_____
Matrix/Level:_____Air/low_____

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
Initial and continuing calibrations meet method specific requirements. Initial calibration retention times meet method specific requirements. Desorption efficiency verification for Naphthalene 99.7 %; meet method specific requirements.				

Criteria

All RFs must be > 0.05 regardless of method requirements for SPCC.
All %RSD must be ≤ 15 % regardless of method requirements for CCC.
All %Ds must be ≤ 30% regardless of method requirements for CCC.
Method TO-15 does not specify criterion for the curve correlation coefficient (r). A limit for r of ≥ 0.995 has therefore been utilized as professional judgment.

Actions

If any compound has an initial RF or a continuing RF of < 0.05, estimate positive results (J) and reject nondetects (R), regardless of method requirements.
If any compound has a %RSD > 15%, estimate positive results (J) and use professional judgment to qualify nondetects.
If any compound has a %RSD > 90%, estimate positive results (J) and reject nondetects (R).
If any compound has a % D > 30%, estimate positive results (J) and reject nondetects (R).
If any compound has a % D > 30%, estimate positive results (J) and nondetects (UJ).
If any compound has a % D > 90%, estimate positive results (J) and reject nondetects (R).
If any compound has r < 0.995, estimate positive results and nondetects.

A separate worksheet should be filled for each initial curve

All criteria were met _X___
Criteria were not met
and/or see below _____

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_02/03/16_____	_1602029-22A__	___air_____	_Naphthalene_____	____0.94_ng____
____All_method_blank_meeth_method_specific_criteria_____				

Note: Reporting limit 1.00 ng; no action taken.

Field/Equipment/Trip blank

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
No_field/trip/equipment_blanks_analyzed_with_this_data_package._____				

All criteria were met _X_
Criteria were not met
and/or see below ____

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

ALs = 10x the amount of common contaminants (methylene chloride, acetone, 2-butanone, and toluene)
ALs = 5x for any other compounds

Specific actions are as follows:

If the concentration is < sample quantitation limit (SQL) and ≤ AL, report the compound as not detected (U) at the SQL.
If the concentration is ≥ SQL but ≤ AL, report the compound as not detected (U) at the reported concentration.
If the concentration is ≥ SQL and > AL, report the concentration unqualified.

Notes:

High and low level blanks must be treated separately
Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

CONTAMINATION SOURCE/LEVEL	COMPOUND	CONC/UNITS	AL/UNITS	SQL	AFFECTED SAMPLES

DATA REVIEW WORKSHEETS

All criteria were met __X__
Criteria were not met
and/or see below _____

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.
List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.
Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND			ACTION
	1,2-DICHLOROETHANE-d4	Toluene-d8	4-BFB	

_Surrogate_recoveries_within_laboratory_control_limits_____
_____
_____
_____
_____
_____

QC Limits* (Air)

_____LL_to_UL___70__to_130__ _70__to_130_ _70__to_130__

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 80 – 120 % for aqueous and 70 – 130 % for solid samples.

Actions:

QUALITY	%R < 10%	%R = 10% - LL	%R > UL
Positive results	J	J	J
Nondetects results	R	UJ	Accept

Surrogate action should be applied:

If one or more surrogate in the VOC fraction is out of specification, but has a recovery of > 10%.

If any one surrogate in a fraction shows < 10 % recovery.

All criteria were met _____
Criteria were not met
and/or see below __N/A___

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

List the %Rs, RPD of the compounds which do not meet the criteria.
Sample ID:_____ Matrix/Level:_____

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION
_____MS/MSD_are_not_required_as_part_of_Method_TO-17;_blank_spike_used_to_assess____					
_____accuracy_____					

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).
If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).
If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

All criteria were met ____
Criteria were not met
and/or see below __N/A__

VII. B MATRIX SPIKE/MATRIX SPIKE DUPLICATE

MS/MSD – Unspiked Compounds

It should be noted that Method TO-15 does not specify a MS/MSD criteria for the unspiked compounds in the sample. A %RSD of < 50% has therefore been utilized as professional judgment.

If all target analytes were spiked in the MS/MSD, this review element is not applicable.

List the %RSD of the compounds which do not meet the criteria.

Sample ID:_____ Matrix/Level/Unit:_____

COMPOUND	SAMPLE CONC.	MS CONC.	MSD CONC.	% RSD	ACTION

Actions:

* If the % RSD > 50, qualify the positive result in the unspiked samples as estimated (J).
* If the % RSD is not calculated (NC) due to nondetected value, use professional judgment to qualify the data.

All criteria were met _X_
Criteria were not met
and/or see below _____

VIII. LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD? Yes or No. If no make note in data review memo.
List the %R of compounds which do not meet the criteria

LCS ID COMPOUND % R QC LIMIT

___LCS/LCSD_(Blank_spike)_analyzed_in_this_data_package;_%_recoveries_and_RPD_____
___within_laboratory_control_limits._____
_____
_____
_____
_____
_____
_____
_____
_____

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).
If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? Yes or **No**.
If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

All criteria were met ___X___
Criteria were not met
and/or see below _____

IX. LABORATORY/FIELD DUPLICATE PRECISION

Sample IDs: _ B30-4IA013016/B30-4IAD013016_____ Matrix:___Air____
Sample IDs: _ B30-4SSV013116/B30-4DSSV013116_ Matrix:___Air____

Field duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.
Suggested criteria: RPD ± 25% for air samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
RPD within the method performance criteria.					

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

All criteria were met __X__
Criteria were not met
and/or see below _____

X. INTERNAL STANDARD PERFORMANCE

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

List the internal standard area of samples which do not meet the criteria.

* Area of +40% or -40% of the IS area in the associated calibration standard.
* Retention time (RT) within ± 0.06 seconds of the IS area in the associated calibration standard.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION

_Internal_standard_area_and_retention_times_within_laboratory_control_limits_for_both_samples_and_calibration_standards_____

Actions:

1. IS actions should be applied to the compound quantitated with the out-of-control ISs

QUALITY	IS AREA < -40%		IS AREA > +40%
Positive results	J		J
Nondetected results	R		ACCEPT

2. If a IS retention time varies more than 0.330 seconds, the chromatographic profile for that sample must be examined to determine if any false positive or negative exists. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for the sample fraction.

All criteria were met __X__
Criteria were not met
and/or see below ____

XII. SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

1602029-05A

Naphthalene RF = 1.45402

[ ] = (43634)(36)/(428005)(1.45402)

= 2.52412 ng OK

Project Number:__1602029____
Date:_____01/30-31/2016___

REVIEW OF VOLATILE ORGANIC PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: QC criteria from "Compendium Method TO-15. Determination of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters and Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS), January, 1999"; USEPA Hazardous Waste Support Branch. Validating Air Samples. Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, (SOP # HW-31. Revision #4. October, 2006). The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) _Eurofins_-_Air_Toxics_____ data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: __1602029_____ Sample matrix: ___Air_____
No. of Samples: _____1_____

Trip blank No.: ____-_____
Field blank No.: _____-_____
Equipment blank No.:___-_____
Field duplicate No.:_____-_____

___X___ Data Completeness
___X___ Holding Times
___X___ GC/MS Tuning
___X___ Internal Standard Performance
___X___ Blanks
___X___ Surrogate Recoveries
___N/A_ Matrix Spike/Matrix Spike Duplicate
___X___ Laboratory Control Spikes
___X___ Field Duplicates
___X___ Calibrations
___X___ Compound Identifications
___X___ Compound Quantitation
___X___ Quantitation Limits

Overall Comments:_____VOCs_by_method_TO-17_____
_____

Definition of Qualifiers:
J- Estimated results
U- Compound not detected
R- Rejected data
UJ- Estimated nondetect

Reviewer: Rafael Lafont
Date:__ _____02/25/2016_____

DATA REVIEW WORKSHEETS

DATA COMPLETENESS

MISSING INFORMATION	DATE LAB. CONTACTED	DATE RECEIVED

All criteria were met _X_
Criteria were not met
and/or see below ____

HOLDING TIMES
The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

SAMPLE ID	DATE SAMPLED	DATE ANALYZED	pH	ACTION
All samples analyzed within the recommended method holding time				

Criteria

Aqueous samples – 14 days from sample collection for preserved samples (pH $\leq$ 2, 4°C), no air bubbles.
Aqueous samples – 7 days from sample collection for unpreserved samples, 4°C, no air bubbles.
Soil samples- 7 days from sample collection.
Cooler temperature (Criteria: 4 $\pm$ 2 °C): 2.8°C

Actions

If the VOCs vial(s) have air bubbles, estimate positive results (J) and reject nondetects (R).
If the % solids of soil samples is 10-50%, estimates positive results (J) and nondetects (UJ)
If the % solid of soil samples is < 10%, estimate positive results (J) and reject nondetects (R).
If holding times are exceeded but < 14 days beyond criteria, estimate positive results (J) and nondetects (UJ).
If holding times are exceeded but < 28 days beyond criteria, estimate positive results (J) and reject nondetects (R).
If holding times are grossly exceeded (> 28 days beyond criteria), reject all results (R).
If samples were not iced or if the ice were melted (> 10°C), estimate positive results (J) and nondetects (UJ).

All criteria were met __X__
Criteria were not met see below ____

GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

__X__ The BFB performance results were reviewed and found to be within the specified criteria.

__X__ BFB tuning was performed for every 24 hours of sample analysis.

If no, use professional judgment to determine whether the associated data should be accepted, qualified or rejected.

List the samples affected:
_____

If mass calibration is in error, all associated data are rejected.

All criteria were met _X__
Criteria were not met
and/or see below ____

CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration:_____11/20/15____
Dates of continuing calibration:___02/04/16____
Instrument ID numbers:____MSD-18_____
Matrix/Level:_____Air/low_____

DATE	LAB FILE ID#	CRITERIA OUT RFs, %RSD, %D, r	COMPOUND	SAMPLES AFFECTED
Initial and continuing calibrations meet method specific requirements. Initial calibration retention times meet method specific requirements.				

Criteria

All RFs must be > 0.05 regardless of method requirements for SPCC.
All %RSD must be ≤ 15 % regardless of method requirements for CCC.
All %Ds must be ≤ 30% regardless of method requirements for CCC.
Method TO-15 does not specify criterion for the curve correlation coefficient (r). A limit for r of ≥ 0.995 has therefore been utilized as professional judgment.

Actions

If any compound has an initial RF or a continuing RF of < 0.05, estimate positive results (J) and reject nondetects (R), regardless of method requirements.
If any compound has a %RSD > 15%, estimate positive results (J) and use professional judgment to qualify nondetects.
If any compound has a %RSD > 90%, estimate positive results (J) and reject nondetects (R).
If any compound has a % D > 30%, estimate positive results (J) and reject nondetects (R).
If any compound has a % D > 30%, estimate positive results (J) and nondetects (UJ).
If any compound has a % D > 90%, estimate positive results (J) and reject nondetects (R).
If any compound has r < 0.995, estimate positive results and nondetects.

A separate worksheet should be filled for each initial curve

All criteria were met _X__
Criteria were not met
and/or see below _____

V A. BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

Laboratory blanks

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS
_02/04/16_____	_1602029-22B__	___air_____	_Benzene_____	____1.0_ng____
_____	_____	_____	_Toluene_____	____0.44_ng___
____All_method_blank_meeth_method_specific_criteria_____				_____
_____	_____	_____	_____	_____

Note: Concentration below reporting limits; no action taken.

Field/Equipment/Trip blank

DATE ANALYZED	LAB ID	LEVEL/ MATRIX	COMPOUND	CONCENTRATION UNITS

No_field/trip/equipment_blanks_analyzed_with_this_data_package._____

All criteria were met __X__
Criteria were not met
and/or see below ____

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

ALs = 10x the amount of common contaminants (methylene chloride, acetone, 2-butanone, and toluene)
ALs = 5x for any other compounds

Specific actions are as follows:

If the concentration is < sample quantitation limit (SQL) and ≤ AL, report the compound as not detected (U) at the SQL.
If the concentration is ≥ SQL but ≤ AL, report the compound as not detected (U) at the reported concentration.
If the concentration is ≥ SQL and > AL, report the concentration unqualified.

Notes:

High and low level blanks must be treated separately
Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

CONTAMINATION SOURCE/LEVEL	COMPOUND	CONC/UNITS	AL/UNITS	SQL	AFFECTED SAMPLES

All criteria were met _X__
Criteria were not met
and/or see below _____

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.
List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.
Matrix: solid/aqueous

SAMPLE ID	SURROGATE COMPOUND			ACTION
	1,2-DICHLOROETHANE-d4	Toluene-d8	4-BFB	

_Surrogate_recoveries_within_laboratory_control_limits_____

QC Limits* (Air)

_____LL_to_UL___70__to_130__ _70__to_130_ _70__to_130__

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 80 – 120 % for aqueous and 70 – 130 % for solid samples.

Actions:

QUALITY	%R < 10%	%R = 10% - LL	%R > UL
Positive results	J	J	J
Nondetects results	R	UJ	Accept

Surrogate action should be applied:

If one or more surrogate in the VOC fraction is out of specification, but has a recovery of > 10%.

If any one surrogate in a fraction shows < 10 % recovery.

All criteria were met _____
Criteria were not met
and/or see below __N/A____

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

1. MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

List the %Rs, RPD of the compounds which do not meet the criteria.
Sample ID:_____ Matrix/Level:_____

MS OR MSD	COMPOUND	% R	RPD	QC LIMITS	ACTION
_____MS/MSD_are_not_required_as_part_of_Method_TO-17;_blank_spike_used_to_assess_____ accuracy_____					

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).
If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).
If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

All criteria were met ____
Criteria were not met
and/or see below __N/A___

VII. B MATRIX SPIKE/MATRIX SPIKE DUPLICATE

MS/MSD – Unspiked Compounds

It should be noted that Method TO-15 does not specify a MS/MSD criteria for the unspiked compounds in the sample. A %RSD of < 50% has therefore been utilized as professional judgment.

If all target analytes were spiked in the MS/MSD, this review element is not applicable.

List the %RSD of the compounds which do not meet the criteria.

Sample ID:_____ Matrix/Level/Unit:_____

COMPOUND	SAMPLE CONC.	MS CONC.	MSD CONC.	% RSD	ACTION

Actions:

* If the % RSD > 50, qualify the positive result in the unspiked samples as estimated (J).
* If the % RSD is not calculated (NC) due to nondetected value, use professional judgment to qualify the data.

All criteria were met __X__
Criteria were not met
and/or see below _____

VIII. LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD? Yes or No. If no make note in data review memo.
List the %R of compounds which do not meet the criteria

LCS ID COMPOUND % R QC LIMIT

___LCS/LCSD_(Blank_spike)_analyzed_in_this_data_package;_%_recoveries_and_RPD_____
___within_laboratory_control_limits._____
_____
_____
_____
_____
_____
_____
_____
_____

* QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
* If QC limits are not available, use limits of 70 – 130 %.

Actions:

QUALITY	%R < LL	%R > UL
Positive results	J	J
Nondetects results	R	Accept

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).
If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? Yes or **No**.
If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

All criteria were met ___X___
Criteria were not met
and/or see below _____

IX. LABORATORY/FIELD DUPLICATE PRECISION

Sample IDs: _____-_____ Matrix:___Air____

Field duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.
Suggested criteria: RPD ± 25% for air samples. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

COMPOUND	SQL	SAMPLE CONC.	DUPLICATE CONC.	RPD	ACTION
No field/laboratory duplicate analyzed with this data package. LCS/LCSD results utilized to assess precision. RPD within the method performance criteria.					

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

All criteria were met __X__
Criteria were not met
and/or see below _____

X. INTERNAL STANDARD PERFORMANCE

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

List the internal standard area of samples which do not meet the criteria.

* Area of +40% or -40% of the IS area in the associated calibration standard.
* Retention time (RT) within ± 0.06 seconds of the IS area in the associated calibration standard.

DATE	SAMPLE ID	IS OUT	IS AREA	ACCEPTABLE RANGE	ACTION

_Internal_standard_area_and_retention_times_within_laboratory_control_limits_for_both_samples_and_calibration_standards_____

Actions:

1. IS actions should be applied to the compound quantitated with the out-of-control ISs

QUALITY	IS AREA < -40%		IS AREA > +40%
Positive results	J		J
Nondetected results	R		ACCEPT

2. If a IS retention time varies more than 0.330 seconds, the chromatographic profile for that sample must be examined to determine if any false positive or negative exists. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for the sample fraction.

All criteria were met __X__
Criteria were not met
and/or see below ____

XII. SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

1602029-13A

Hexane RF = 0.69128

[ ] = (2299995)(26)/(67035)(0.69128)

= 1290.5 ng OK

All criteria were met __X__
Criteria were not met
and/or see below ____

XII. QUANTITATION LIMITS

A. Dilution performed

SAMPLE ID	DILUTION FACTOR	REASONS FOR DILUTION
No dilution performed.		

B. Percent Solids

List samples which have ≤ 50 % solids

Actions:

If the % solids of a soil sample is 10-50%, estimate positive results (J) and nondetects (UJ)

If the % solids of a soil sample is < 10%, estimate positive results (J) and reject nondetects (R)